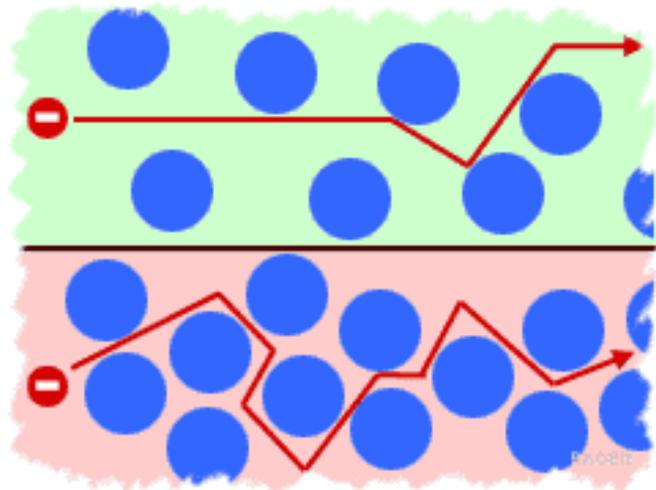


Conductors and Conductivity (General information for the Caribbean and the world)

There are many materials that allow charges to move easily. They are called **conductors**. Conductors have the quality of **conductivity**. I guess that's not a lot of help for you. The reality is that you just need to understand the difference between those two words. The conductor is the object that allows **charge** to flow. Conductivity is a quality related to the conductor. A material that is a good conductor gives very little **resistance** to the flow of charge. This flow of charge is called an electric **current**. A good conductor has high conductivity.

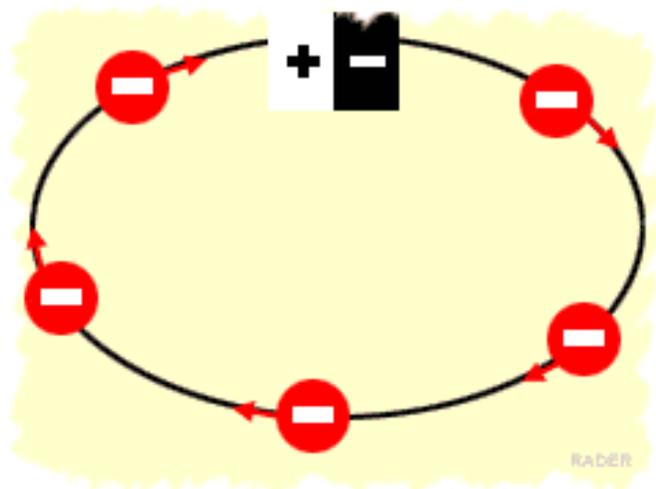


Different Types of Conductors

(1) **Metals** are traditional conducting materials. You see them around the house all of the time. It's a metal wire or one of the metal prongs in an electric plug. There are a lot of free electrons in metallic conductors. Free electrons are electrons that are not being held in atoms, and so, can move easily. Some of the best metallic conductors are copper (Cu), silver (Ag), and gold (Au).

(2) There are some conductors that are not metals. Carbon is the best example.

(3) You've probably seen ionic conductors in a lab or in an experiment. When you think about **ionic conductors**, think about solutions and molten conductors. **A solution** such as saltwater has a lot of free ions floating around. Those ions (charged atoms) can flow easily, and ionic solutions are very good conductors. One of the reasons you need to get out of the water if there is lightning around, is that water normally contains dissolved ions, and if lightning hits the liquid (solution), it might conduct electricity long distances and electrocute you.

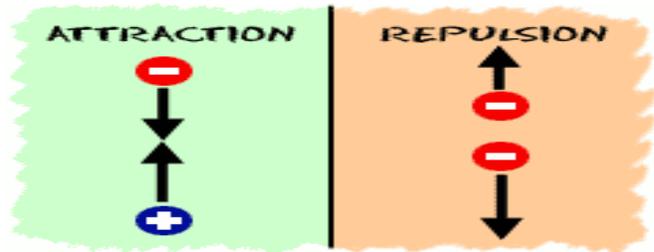


(4) **Semi-conductors** are the conductors that make your computer possible. If it weren't for semi-conductors, most electronic doodads couldn't be made. Semiconductors have free electrons, but not as many as conductors, and they are not as easy to get moving. Semiconductors have low conductivities. Examples are elements like silicon (Si) and germanium (Ge).

Let Them Move

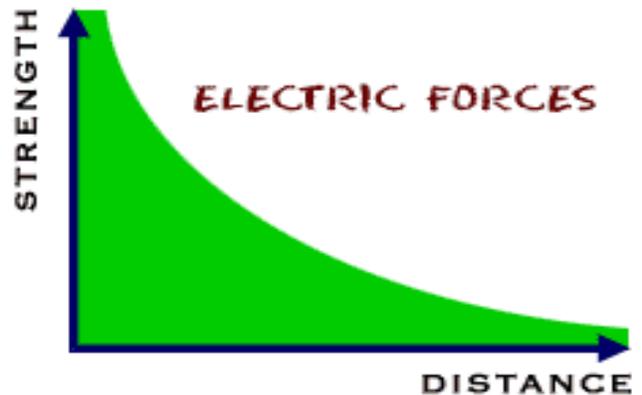
So what happens if you have separated charges and you connect them with conducting material? Providing a path for charges to move, and making that path out of materials that allow easy movement, results in a flow of charge

(electrons) called a **current**. The electrons will flow from a location that is negative to one that is positive. This can happen quickly and then stop, as with a spark. Or, in the case of a battery connected to a conducting loop (called a circuit.), it continues to happen until the battery runs out of energy. If the current goes in one direction all the time, it is called DC, or **direct current**. In your home, however, the same charges move back and forth, so this is called AC, or **alternating current**.



Force of Charges

Scientists discovered that opposite charges attract, and like charges repel. So positive-positive and negative-negative would repel, while positive-negative would attract. Physicists use the term **electric force** to describe these attractions and repulsions. The electric forces are much stronger when negative charges are closer to positive charges. The further apart two charges are, the weaker the electric force. Also, the greater the charges, the greater the electric force will be.



http://www.physics4kids.com/files/elec_conduct.html